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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



# Office Action Summary

**Application No.**

10/531,962

**Applicant(s)**

CIOC ET AL.

**Examiner**

GERARD T. HIGGINS

**Art Unit**

1785

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 24 February 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 29-56 is/are pending in the application.
- 4a) Of the above claim(s) 52-56 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 29-51 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/22)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date: \_\_\_\_\_



## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 02/24/2010 has been entered.

### ***Response to Amendment***

2. Applicant's amendment filed 02/24/2010 has been entered. Currently claims 29-56 are pending, claims 1-28 are cancelled, and claims 29-56 are new.

### ***Election/Restrictions***

3. Newly submitted claims 52-56 are directed to an invention lacks unity with the invention originally claimed for the following reasons:

The original storage medium and the process of storage of data include a reflective coating, which is a special technical feature not present in claims 52-56; furthermore, the previously cited art still applies to claim 29, and therefore there is no special technical feature that, as a whole, defines the invention over the prior art. Since there is no corresponding special technical feature common among claims 29 and 52,



there is no special technical feature that binds the inventions together; hence, the inventions lack unity. This is the same rationale set forth in the Office action mailed on 03/09/2009.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 52-56 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

#### ***Claim Objections***

4. Claims 30, 33, 35, and 36 are objected to because of the following informalities:

In claim 30, the phrase "by the focused laser beam" is objected to grammatically. The objection will be withdrawn if the phrase is changed to "with the focused laser beam," which is how the claim will be interpreted.

In claim 33, the phrase "the metallic ions are of" is objected to for grammatical reasons. The objection will be withdrawn if the phrase is changed to "the metallic ions are," which is how the claim will be interpreted.

In claim 35, the phrase "turned toward" is objected to for grammatical reasons. The objection will be withdrawn if the phrase is changed to "facing," which is how the claim will be interpreted.

In claim 36, the phrase "by focused electromagnetic or particle irradiation" is objected to grammatically. The objection will be withdrawn if the phrase is changed to



"with focused electromagnetic or particle irradiation," which is how the claim will be interpreted.

Appropriate correction is required.

5. Claims 45, 46, 48, 49, and 51 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

With regard to claims 45 and 46, these claims are attempting to define a method of reading the medium; however, the claim from which they depend is drawn to a method of storing data, and therefore claims 45 and 46 fail to further limit claim 36.

With regard to claim 48, the claim attempts to state that the reduction of metallic ions to particles occurs through heating of the "entire" storage medium; however, this fails to limit the claim from which it depends because claim 36 sets forth that the reduction occurs via focused irradiation and also claim 47 sets forth that the reduction occurs via absorption of radiation. Each of these differ from heating of the entire storage medium, and therefore claim 48 fails to limit the claim from it depends.

With regard to claim 49, this claim attempts to set forth a deletion method; however, the claim from which it depends is drawn to a method of storing data, and therefore claim 49 fails to further limit claim 36.

With regard to claim 51, this claim seeks to set forth a method of "retrieving data," i.e. reading the data from the storage medium; however, the claim from which it



depends is drawn to a method of storing data, and therefore claim 51 fails to further limit claim 36. Additionally, according to claim 36, the disc at least has the metallic ions reduced to metallic particles, and therefore there will not be such locally doped areas that have an index of refraction difference.

***Claim Rejections - 35 USC § 112***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 29-51 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

With regard to claim 29, the limitations that there are "metallic ions in the glass storage disk or on the other face thereof" are not supported by the specification as originally filed. The first part that there are "metallic ions in the glass storage disk" is not supported because this term is broad enough that the metallic ions could be anywhere in the glass storage disk; however, it is clear from at least page 2, lines 15-19 that the metallic ions are only present in the surface of the glass storage disk. This second part that there are "metallic ions...on the other face thereof" is not supported because this means that the metallic ions are on a face opposite from the reflective coating and the



polymer disk. This is not supported because the embodiment comprising the reflective coating and the polymer disk specifically has the metallic ions located between the reflective coating and the glass storage disk. The Examiner would find support for the following rewritten claim 29:

29. "A storage medium for the storage of data, the storage medium comprising:  
a glass storage disk having opposite faces;  
metallic ions in a uniform doped layer in one of the faces of the glass storage disk or metallic ions in a layer of donor medium on the one of the faces of the glass storage disk;  
a reflective coating on the metallic ions;  
and a polymer disk on the reflective coating;  
wherein the metallic ions being so constituted that when irradiated with a focused laser beam these metallic ions are reduced to metallic particles in the glass storage disk."

With regard to claim 30, the limitations that there is "a doped layer in the glass disk" does not find support in the specification as originally filed. These limitations not supported because this term is broad enough that the metallic ions could be anywhere in the glass storage disk; however, it is clear from at least page 2, lines 15-19 that the metallic ions are only present in the surface/face of the glass storage disk. The Examiner would find support for the following amended claim 30 along with the amended claim 29 set forth above:



30. "The storage medium for the storage of data defined in claim 29, wherein the metallic ions are in the uniform doped layer in one of the faces of the glass storage disk, whereby irradiation with the focused laser beam can convert the metallic ions of the uniform doped layer into the metallic particles or aggregations of the metallic particles in the glass storage disk."

With regard to claim 32, the Examiner does not find support for a layer of donor medium "on the other face of the glass disk" in the specification as originally filed. This means that the metallic ions are on a face opposite from the reflective coating and the polymer disk. This is not supported because the embodiment comprising the reflective coating and the polymer disk specifically has the metallic ions located between the reflective coating and the glass storage disk. The Examiner would find support for the following rewritten claim 32 along with the amended claim 29 set forth above:

32. "The storage medium for the storage of data defined in claim 29, wherein the metallic ions are in the layer of donor medium on the one of the faces of the glass storage disk."

With regard to claim 36, the limitations that there are "metallic ions in or on the glass storage disk" are not supported by the specification as originally filed. The first part that there are "metallic ions in...the glass storage disk" is not supported because this term is broad enough that the metallic ions could be anywhere in the glass storage disk; however, it is clear from at least page 2, lines 15-19 and page 4, lines 19-24 that



the metallic ions are present in the surface of the glass storage disk in a uniform layer. This second part that there are "metallic ions...on the glass storage disk" is not supported because this means that the metallic ions could be on a face of the glass storage disk opposite from the reflective coating and the polymer disk. This is not supported because the embodiment comprising the reflective coating and the polymer disk specifically has the metallic ions located between the reflective coating and the glass storage disk. The Examiner would find support for the following rewritten claim 36; however, please note that claims 37 and 39 would need to be amended:

36. "A method of storing data on a storage medium, the method comprising the steps of:

- providing a storage medium having

- a glass storage disk having opposite faces,

- metallic ions in a uniform doped layer in one of the faces of the glass storage disk or metallic ions in a layer of donor medium on the one of the faces of the glass storage disk,

- a reflective coating on the metallic ions,

- and a polymer disk on the reflective coating; and writing to the storage medium by irradiating the glass storage disk with focused electromagnetic or particle irradiation and thereby reducing the metallic ions to metallic particles in the glass storage disk which define the data being stored."



With regard to claim 38, the Examiner does not find support wherein the "doped layer is formed as a helical track" for this embodiment in the specification as originally filed. The helically formed doping is for a specific embodiment where the metallic ions are first transferred from the layer of donor medium.

With regard to claim 40, the Examiner does not find support wherein "a doped layer is formed by locally doping the glass disk" in the specification as originally filed. Applicants are attempting to incorporate too many embodiments into the same independent claim, wherein these multiple embodiments are not supported as one all-encompassing independent claim because the separate embodiments require separate method limitations to arrive at the claimed stored data.

With regard to claim 41, the Examiner does not find support in the specification as originally filed for using "a second focused laser beam" to reduce the metallic ion to metallic clusters. At least from page 4, lines 8-18 it is clear that the embodiment of claim 41 refers to using the same focused laser beam to do both the processes of claims 40 and 41.

With regard to claim 43, the Examiner does not find support for a layer of donor medium to be "on the other of its faces" of the glass storage disk in the specification as originally filed. This is not supported because the embodiment comprising the reflective coating and the polymer disk specifically has the metallic ions located between the reflective coating and the glass storage disk.

With regard to claim 47, the limitation that "the ions are reduced to metallic particles by resonance-enhanced absorption of radiation does not find support in the



specification as originally filed. Resonance-enhanced absorption occurs by the metallic particles that then grow into an aggregation of metallic particles (page 6, line 18 to page 7, line 3).

With regard to claim 51, the Examiner does not find support for this embodiment of having locally doped areas that have an index of refraction difference in combination with the method limitations of claim 36. These are different embodiments and claim 36 explicitly sets forth that the metallic ions are reduced to metallic particles in order to store data, and therefore the disc will not have locally doped areas that are data because those areas will be reduced to metallic particles. Please delete this claim.

8. Claims 29-51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 29 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The metallic ions can be "on the other face" of the glass storage disk; however, with a focused laser beam the metallic ions are reduced to metallic particles "in the glass storage disk." There is no explanation as to how the metallic ions get into the glass storage disk, and therefore the omitted structural cooperative relationships are that the metallic ions transfer to the glass storage disk and then are



reduced. Please note that the proposed claim 29 presented in section 7 above would require further limitations to overcome this rejection. For the purposes of examination, proposed claim 29 in section 7 above will be used.

Each of claims 30-32, 36, 37, 40-44, and 51 recite the limitation "the glass disk." There is insufficient antecedent basis for this limitation in each of these claims. There is some confusion about the term because applicants alternatively use "the glass disk" and "the glass storage disk" throughout their claims, and therefore it is unclear if this is meant to be a different glass disk than that originally seen in claims 29 and 36. The limitation will be treated as "the glass storage disk" in each instance it appears.

With regard to claim 30, the claim recites "a doped layer in the glass disk;" however, it is unclear if this is meant to be the same as the metallic ions in the glass storage disk recited in claim 29. Please see section 7 above for the full text of proposed claim 30 that would be both supported and definite.

Claim 30 recites the limitation "the doping" in the third line of the claim. There is insufficient antecedent basis for this limitation in the claim. The Examiner will interpret this limitation as "the uniform doping layer." Please see section 7 above for the full text of claim 30 that would be both supported and definite.

With regard to claim 31, the term "generally at the one face" is a relative term which renders the claim indefinite. The term "generally at the one face" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear how close to the face "generally at the one face" is



meant to encompass. If applicants accept the Examiner's proposed amendments to claims 29 and 30 presented in section 7 above, this claim would be unnecessary and should be deleted.

With regard to claim 32, the claim recites "a layer of donor medium holding the metallic ions;" however, it is unclear if this is meant to be the same as the metallic ions on the other face of the glass storage disk recited in claim 29. Please see section 7 above for the full text of proposed claim 32 that would be both supported and definite, which is how the Examiner will interpret the claim.

Claim 36 is rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The metallic ions can be "on the glass storage disk" of the glass storage disk; however, with a focused laser beam the metallic ions are reduced to metallic particles "in the glass storage disk." There is no explanation as to how the metallic ions get into the glass storage disk, and therefore the omitted essential steps for this embodiment are that the metallic ions transfer to the glass storage disk and then are reduced. Please note that the proposed claim 36 presented in section 7 above would require further limitations to overcome this rejection.

Claim 36 recites the limitation "the disk" in the eighth line of the claim. There is insufficient antecedent basis for this limitation in the claim. This rejection can be overcome by changing the limitation to "the storage medium," which is how the claim will be interpreted.



With regard to claim 36, the phrase "and defining the data being stored" renders the claim indefinite because it is unclear if the metallic ions that are reduced to metallic particles on lines 8-10 of the claim are meant to be the data being stored. This rejection can be overcome by changing the limitations to "which define the data being stored," which is how this limitation will be interpreted.

With regard to claim 37, the claim recites "a doped layer holding the metallic ions;" however, it is unclear if this is meant to be the same as the metallic ions in the glass storage disk recited in claim 36 or if this is a doped layer resulting from the layer of donor medium implied by the metallic ions on the glass storage disk. This rejection is related to the rejection of claim 36 for omitting essential steps.

Claim 39 recites the limitation "at the one face" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim; further, it is unclear if "at" is meant to be the same as the limitation "in" or "on" recited in claim 36. For the purposes of examination, the limitation will be interpreted as "in the one of the faces."

With regard to claim 40, this claim is indefinite because it is unclear from where the doping layer is coming, it is unclear if the focused electromagnetic or particle irradiation is doing the local doping, and it is unclear if the focused electromagnetic or particle irradiation is applying the temperature range claimed. Applicants are attempting to incorporate too many embodiments into the same independent claim and the incorporation of these multiple embodiments leads to claims that are indefinite because they omit essential method steps.



With regard to claim 40, the term "locally doping" is a relative term which renders the claim indefinite. The term "locally doping" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear what would comprise a "locally" doped material.

Claim 40 recites the limitation "the glass" in the third line of the claim. There is insufficient antecedent basis for this limitation in the claim. This rejection can be overcome by changing the limitations to "a glass," which is how the claim will be interpreted.

With regard to claim 41, the claim is indefinite because it is unclear if the "metallic clusters" are the same as the "metallic particles" of claim 36, it is unclear from where the locally doped areas are coming, and it is unclear if the focused electromagnetic or particle irradiation is doing the local doping.

With regard to claim 41, the term "locally doped areas" is a relative term which renders the claim indefinite. The term "locally doped areas" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear what would comprise a "locally" doped material.

Claim 41 recites the limitation "the metal ions" in the third line of the claim. There is insufficient antecedent basis for this limitation in the claim. This rejection will be overcome by changing the limitation to "the metallic ions," which is how the claim will be interpreted.



Claim 41 recites the limitation "the locally doped areas" in the fourth line of the claim. There is insufficient antecedent basis for this limitation in the claim.

With regard to claim 41, the phrase "a second focused laser beam" renders the claim indefinite because a first focused laser beam has never been established, and it is unclear if the focused electromagnetic or particle irradiation has been modified to be a first focused laser beam.

Claim 42 recites the limitation "the first focused laser beam" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim 42 recites the limitation "the metal ions" in the third line of the claim. There is insufficient antecedent basis for this limitation in the claim. This rejection will be overcome by changing the limitation to "the metallic ions," which is how the claim will be interpreted.

With regard to claim 42, the claim is indefinite because it is unclear if the "metallic clusters" are the same as the "metallic particles" of claim 36, it is unclear from where the locally doped areas are coming, and it is unclear if the focused electromagnetic or particle irradiation is doing the local doping.

With regard to claim 42, the term "locally doping" is a relative term which renders the claim indefinite. The term "locally doping" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is unclear what would comprise a "locally" doped material.



Claim 43 recites the limitation "the particles" in the fifth line of the claim. There is insufficient antecedent basis for this limitation in the claim. This rejection can be overcome if this limitation is changed to "the metallic particles," which is how the claim will be interpreted.

Claim 44 recites the limitation "the other face" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim. This rejection can be overcome if this limitation is changed to "the other of its faces," which is how the claim will be interpreted.

With regard to claim 45, given the fact that claim 36 is a "process for storage of data," the recitation of positive method steps comprising a method of reading stored data renders the claim indefinite. Any prior art that reads on claim 36 will be held to read on claim 45. This rejection can be overcome by deleting this claim.

With further regard to claim 46, the phrase "reading and writing of the information with a laser beam" renders the claim indefinite. The reason is that the process of claim 36 is drawn to a storage method and not a reading method. Any prior art that reads on claim 36 will be held to read on claim 46. This rejection can be overcome by deleting this claim.

Claim 47 recites the limitation "the ions" in the second line of the claim. There is insufficient antecedent basis for this limitation in the claim. This rejection will be withdrawn if the phrase is changed to "the metallic ions," which is how the claim will be interpreted.



With regard to claim 48, the claim is indefinite because it contradicts the method steps of claim 36. Claim 36 sets forth that the reduction occurs by “focused” electromagnetic or particle irradiation, which does not agree with heating of the “entire” storage medium to effectuate reduction. Applicants are attempting to incorporate too many embodiments into the same independent claim and the incorporation of these multiple embodiments leads to claims that are indefinite because the embodiments are meant to be mutually exclusive.

With regard to claim 49, this claim recites positive method steps that comprise a deletion method. Claim 36 is drawn to a process of storing data, and therefore claim 49 is indefinite because it is not a process of storing data. Any prior art that reads on claim 36 will be held to read on claim 49. This rejection can be overcome by deleting this claim.

With regard to claim 51, the claim is indefinite because there is no locally doped areas of metallic ions to be read because claim 36 sets forth that they have been reduced to metallic particles; furthermore, the claim is indefinite because it is drawn to a process of retrieving data and not a process of storing data. Any prior art that reads on claim 36 will be held to read on claim 51. This rejection can be overcome by deleting this claim.

***Claim Rejections - 35 USC § 103***

5. Claims 29-31, 33-37, 39, 45, 46, and 49-51 are rejected under 35 U.S.C. 103(a) as obvious over Wu (5,078,771) in view of Nomura et al.’s “Super-Resolution Read-



Only Memory Disk with Metal Nanoparticles or Small Aperture," Jap. J. Appl. Phys. Pt. 1, vol. 41(3B) pp. 1876-1879 (March 2002) and Bouldin et al. (4,762,770).

With regard to claims 29-31 and 34-36, Wu describes a storage medium comprising a glass dielectric layer, which has an integral ion-exchanged surface layer (IIES layer) that is in the glass substrate and not laminated on top thereof, which reads on applicants' metallic ions "in the glass storage disk" of claims 29 and 36 and the doped layer of claims 30 and 37 (col. 27, lines 50-63). Wu discloses forming reduced elemental silver in the form of specks or particles by application of high energy beams, which reads on the "focused electromagnetic or particle irradiation" claimed (col. 30, lines 3-21); however, Wu fails to specifically disclose or render obvious the polymer layer and reflective coating of claims 29 and 36, the optically functional structure in a polymer layer on a side facing the storage glass material of claims 34 and 35, and the doping arranged in proximity of a surface of the storage glass material facing the polymer layer of claim 31.

Nomura et al. disclose the structure of an optical recording medium in their Figure 5.

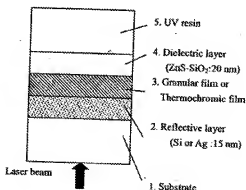


Fig. 5. Cross-sectional view of the sample disk.



Nomura et al. disclose that their granular film comprises small silver particles, wherein reflectivities are changed by increasing the silver particle size. The granular film layer **3** reads on applicants' glass storage glass disk with the metallic ions, the substrate **1** is reads on applicants' polymer disk (Nomura et al. discloses the substrate may be polycarbonate, same as applicants), there is a reflective layer **2** arranged in between the granular film layer and the substrate, and there are tracks, which read on the optically functional structures of claims 7 and 10, on the polycarbonate substrate facing the granular film layer (pp. 1877, col. 2).

Since Nomura et al. and Wu are both drawn to optical recording media featuring layers with dispersed metal particles therein; it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the substrate with an optically functional structure and reflective layer facing in a specific direction of Nomura et al. with the glass dielectric layer comprising an IIES layer of Wu. The results of this combination would have been predictable to one having ordinary skill in the art of CD/DVD manufacture; furthermore, each element would have performed the same in combination as they had separately. Additionally, Nomura et al. disclose using his recording medium to increase data capacity and recording density, which is extremely beneficial in the art of CD/DVD manufacture; further, the motivation to provide a means for tracking would be to make sure that the disc could be played in conventional optical recording/reproducing devices.

Bouldin et al. disclose their optical memory disc of Figure 3.



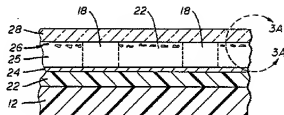


FIG. 3.

The disc has a substrate layer 22 that may be opaque, a reflective layer 24, a silver containing gelatin layer 25, and a transparent protective layer 28 (col. 4, lines 21-54). It is intrinsic to the reference that layer 25 is exposed to radiation through the transparent protective layer 28 (col. 4, lines 28-39).

Since Wu, Nomura et al., and Bouldin et al. are drawn to optical recording using metallic particles; it would have been obvious to one having ordinary skill in the art at the time the invention was made to have performed the recording process through the glass storage disk. One of ordinary skill would recognize recording in the IIES layer of Wu through the transparent glass storage disk would produce predictable results and it would lead to an IIES layer directly adjacent the reflective layer, which would then require less intense irradiation to perform recording.

The limitations in claim 29 wherein the "metallic ions being so constituted that when irradiated with a focused laser beam these metallic ions are reduced to metallic particles in the glass storage disk" represent functional limitations of the storage medium; however, the Examiner again notes that Wu discloses forming reduced elemental silver in the form of specks or particles by application of high energy beams, which reads on the "focused laser beam" claimed (col. 30, lines 3-21).



With specific regard to claim 30, the Examiner notes Wu teach the structural limitations of this claim as set forth above. With regard to the functional limitations set forth in the claim, Wu can intrinsically perform these intended use limitations because the optical disk is identical to that claimed.

With regard to claim 33, the IIES layer may is comprised of silver ions (col. 4, lines 22-33).

With regard to claim 37 and 39, the IIES layer of Wu reads on these claims.

With regard to claims 45 and 46, given that Wu in view of Nomura et al. and Bouldin et al. teach all of the limitations of the storage medium, this storage medium can perform these methods of reading steps. It is also noted that Wu teach forming these devices into read-only discs (col. 43, lines 14-22) and Bouldin et al. teach using laser beam through the transparent protective layer **28** to read their discs.

With regard to claim 49, given that Wu in view of Nomura et al. and Bouldin et al. teach all of the limitations of the storage medium, this storage medium can perform these methods of reading steps. It is also noted that Wu teach erasure using heat (col. 45, lines 52-68).

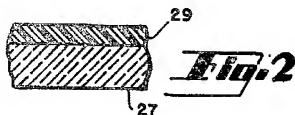
With regard to claim 50, Wu teach that analog data may be stored with a full range of grey scales (col. 5, lines 42-46). It is intrinsic to the reference that this analog recording is done varying an intensity of the electromagnetic or particle radiation.

With regard to claim 51, given that Wu in view of Nomura et al. and Bouldin et al. teach all of the limitations of the storage medium, this storage medium can perform these method steps of retrieving data.



6. Claims 29 and 32-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Drexler et al. (4,269,917) in view of Nomura et al. "Super-Resolution Read-Only Memory Disk with Metal Nanoparticles or Small Aperture," Jap. J. Appl. Phys. Pt. 1, vol. 41(3B) pp. 1876-1879 (March 2002).

With regard to claims 29, 32, 34, and 35, Drexler et al. teach the data storage medium, which reads on applicants' storage medium, of Figure 2.



The data storage medium is comprised of a substrate 27, which may be made of glass and reads on applicants' glass storage disk, and a silver-halide emulsion layer 29, which reads on applicants' layer of donor medium for metallic ions (col. 5, lines 57-62 and col. 6, lines 26-30); however, Drexler et al. fail to disclose that the disc structure has a reflective layer and a polymer disk, wherein the reflective layer is situated in between the glass storage disk and the polymer disk; further, that the polymer disk has an optically functional structure on a side of the polymer disk facing the glass storage disk.

Nomura et al. disclose the structure of an optical recording medium in their Figure 5.



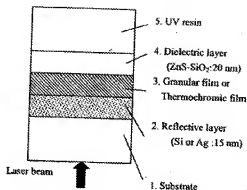


Fig. 5. Cross-sectional view of the sample disk.

The substrate and silver-halide emulsion layer of Drexler et al. read on the granular film layer location 3 of Nomura et al. because they both represent the recording layer of the media, the substrate 1 reads on applicants' polymer disk (Nomura et al. discloses the substrate may be polycarbonate, same as applicants), there is a reflective layer 2 arranged in between the granular film layer and the substrate, and there are tracks, which read on the optically functional structures of claims 34 and 35, on the polycarbonate substrate, which the Examiner deems is intrinsically facing the granular film layer (pp. 1877, col. 2). Nomura et al. disclose that their granular film comprises small silver particles, wherein the reflectivity is changed by increasing the silver particle size.

Since Nomura et al. and Drexler et al. are both drawn to optical recording media featuring recording layers of silver; it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the substrate with an optically functional structure facing in a specific direction and the reflective layer of Nomura et al. with the substrate and silver-halide emulsion layer of Drexler et al. The results of this combination would have been predictable to one having ordinary skill in



the art of CD/DVD manufacture; furthermore, each element would have performed the same in combination as they had separately. The motivation to provide a means for tracking would be to make sure that the disc could be playing in conventional optical recording/reproducing devices; further, the motivation to provide a polymer layer would be to protect the silver halide emulsion layer; furthermore, the motivation to provide a reflective layer is to decrease the required laser intensity to color the recording layer. It would have also been obvious to have the silver-halide emulsion layer arranged to be facing towards the reflective layer because that would guarantee that the maximum amount of radiation was focused on the silver-halide emulsion layer, such that a minimum recording radiation would be required; further, the silver-halide emulsion layer would then be protected on the inside of the disk structure.

The limitations in claim 29 wherein the "metallic ions being so constituted that when irradiated with a focused laser beam these metallic ions are reduced to metallic particles in the glass storage disk" represent functional limitations of the storage medium. Given that the storage medium of Drexler et al. in view of Nomura et al. and Bouldin et al. render obvious all of the claimed structural limitation, their disc can perform the functional limitations claimed.

With regard to claim 33, Drexler et al. teach silver-halide emulsions, which read on silver.



***Response to Arguments***

9. Applicant's arguments with respect to claims 1, 2, 5, 7, 9, 10, 13-17, and 19-28 have been considered but are moot in view of the new ground(s) of rejection.

Applicants have presented a similar set of limitation within their claims new claims 29-56.

It is noted that the functional limitations of claim 29 do not lead claim 29 to being allowable. The Examiner has not changed his position throughout prosecution on this aspect. The teachings of Wu and Drexler et al. show articles having an IIES layer within a glass substrate, i.e. "metallic ions in the glass storage disk," and a silver halide emulsion on a glass substrate, i.e. "metallic ions on one of the faces thereof." These articles are identical and can therefore intrinsically perform the functional limitations claimed.

With regard to the method of recording of claims 36-44, 47, 48, and 50, the Examiner notes that applicants have broadened claim 36 versus previous method claim 13 by including the arrangement wherein the "metallic ions are in the glass storage disk." This arrangement is taught by Wu. The subject matter that the Examiner has not found in the prior art is where the metallic ion are in "a layer of donor material," which is then irradiated with a "focused electromagnetic or particle irradiation" to transfer and reduce metallic ions, which define the stored data.



***Conclusion***

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to GERARD T. HIGGINS whose telephone number is (571)270-3467. The examiner can normally be reached on M-F 10am-8pm est. (Variable one work-at-home day).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Ruthkosky can be reached on 571-272-1291. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Mark Ruthkosky/  
Supervisory Patent Examiner, Art Unit 1785

GERARD T. HIGGINS  
Examiner  
Art Unit 1785

/G. T. H./  
Examiner, Art Unit 1785